

IN THE CLAIMS

Please amend the Claims as follows:

1 1. (Original) A powered boatlift comprising:
2 a plurality of support legs;
3 a boat lifting structure moveably mounted to said plurality of support legs;
4 a cable assembly having a connecting end and a lifting end connected in
5 cooperation with said boat lifting structure for causing said boat lifting structure to be
6 raised or lowered;
7 an electric drive unit having a drive shaft capable of rotating in a first direction in
8 response to a first input signal or rotating in a second direction in response to a second
9 input signal;
10 a drive coupling structure coupled to said drive shaft;
11 a ball screw assembly having a first portion coupled to said coupling structure and
12 a second portion coupled to said connecting end.

1 2. (Original) A powered boatlift as in Claim 1, wherein
2 said first portion of said ball screw assembly includes an elongated ball screw
3 having a driving end coupled to said coupling structure wherein said coupling structure
4 rotatably supports said driving end; and
5 said second portion of said ball screw assembly includes a ball nut associated with
6 said elongated ball screw, said ball screw having a cable connection coupled to said
7 connecting end of said cable assembly.

1 3. (Original) A powered boatlift as in Claim 2, wherein said drive coupling
2 structure includes:
3 a drive train assembly having
4 an input drive coupled to said drive shaft for receiving high-speed low-torque
5 input from said electric drive unit;
6 a torque conversion mechanism coupled to said input drive for converting said
7 high-speed low-torque input to a low-speed high-torque output at an output drive; and

8 an output coupling intermediate said output drive of said torque conversion
9 mechanism and said driving end of said elongated ball screw.

1 4. (Original) A powered boatlift as in Claim 3, wherein said torque conversion
2 mechanism includes:

3 a speed-reducing structure driven by said input drive and having an output drive
4 shaft; and

5 a torque-increasing structure driven by said output drive shaft and coupled to said
6 output coupling.

1 5. (Original) A powered boatlift as in Claim 4, wherein
2 said speed-reducing structure is a pulley assembly and is belt driven; and
3 said torque-increasing structure is a gear assembly and is chain driven.

1 6. (Original) A powered boatlift as in Claim 3, wherein said torque conversion
2 mechanism includes:

3 a first drive pulley having a first predetermined diameter coupled to said input
4 drive;

5 a pulley drive shaft having a driven end and a driving end;

6 a second drive pulley having a second predetermined diameter larger than said
7 first predetermined diameter, said second drive pulley rotatably supported by said pulley
8 drive shaft at said driven end;

9 a belt intercoupling said first drive pulley and said second drive pulley;

10 a first drive gear having a third predetermined diameter mounted on said driving
11 end of said pulley drive shaft;

12 a gear drive shaft having a driven end and a driving end;

13 a second drive gear having a fourth predetermined diameter larger than said third
14 predetermined diameter, said first drive gear rotatably supported by said gear drive shaft
15 at said driven end;

16 a chain intercoupling said first drive gear and said second drive gear; and

17 an output coupling intercoupling said driving end of said gear drive shaft and said
18 driving end of said elongated ball screw.

1 7. (Original) A boatlift structure as in Claim 6, wherein
2 a first ratio of said first predetermined diameter to said second predetermined
3 diameter establishes a predetermined speed reduction at said pulley drive shaft; and
4 a second ratio of said third predetermined diameter to said fourth predetermined
5 diameter establishes a predetermined torque increase at said output coupling.

1 8. (Original) A powered boatlift structure as in Claim 3, and further including a
2 lift movement limiting mechanism comprising:

3 a lift measuring mechanism capable of determining the extent of upward and
4 downward movement of said lifting structure;

5 a first disabling structure coupled to said lift measuring mechanism to disable
6 power to said electric drive unit when said lift measuring mechanism determines that a
7 predetermined permissible upward movement of said lifting structure has been achieved;
8 and

9 a second disabling structure coupled to said lift measuring mechanism to disable
10 power to said electric drive unit when said lift measuring mechanism determines that a
11 predetermined permissible downward movement of said lifting structure has been
12 achieved.

1 9. (Original) A powered boatlift structure as in Claim 3, wherein said electric
2 drive unit includes:

3 a reversible electric motor; and

4 a control circuit coupled to said electric motor to selectively control the direction
5 of rotation of said electric motor in response to said first signal and said second signal.

1 10. (Original) A powered boatlift structure as in Claim 9, wherein said control
2 circuit includes:

3 a load limit detecting circuit to provide a disabling signal to disable application of
4 power to said reversible electric motor when electrical current flow to said reversible
5 electric motor is detected to be in excess of a predetermined permissible level.

1 11. (Original) A power boatlift structure as in Claim 10, and further including:
2 a manual reset actuator coupled to said control circuit to enable operation of said
3 control circuit after a said disabling signal has been provided by said load circuit
4 detecting circuit.

1 12. (Original) A powered boatlift structure as in Claim 9, wherein said control
2 circuit includes:

3 a first manually operable switch to provide said first signal to apply electrical
4 circuit to said reversible electric motor to cause rotation in a first direction; and
5 a second manually operable switch to provide said second signal to apply
6 electrical current to said reversible electric motor to cause rotation in a second direction.

1 13. (Original) A powered boatlift structure as in Claim 9, wherein said control
2 circuit includes a

3 receiver circuit responsive to a first remote signal to provide said first signal to
4 apply electrical current to said reversible electric motor to cause rotation in a first
5 direction; and responsive to a second remote signal to provide said second signal to apply
6 electrical current to said reversible electric motor to cause rotation in a second direction.

1 14. (Original) A powered boatlift structure as in Claim 9, wherein said control
2 circuit includes:

3 a first switch to provide said first signal;
4 a second switch to provide said second signal;
5 a receiver responsive to a first remote signal to protect said first signal and
6 responsive to a second remote signal to provide said second signal.

1 15. (Original) A powered boatlift structure as in Claim 9, wherein said control
2 circuit includes:

3 a reversal delay circuit to delay application of said first signal or said second
4 signal by a predetermined delay time interval to delay reversal of rotation of said
5 reversible electric motor.

1 16. (Original) A powered boatlift structure as in Claim 1, and further including:

2 a brake mechanism for holding said boat lifting structure in place when said
3 electric device unit does not have electrical current applied.

1 17. (Original) A powered boatlift structure as in Claim 1, wherein one or more of
2 said plurality of support legs includes a boatlift leveling mechanism.

1 18. (Original) A powered boatlift structure as in Claim 17, wherein said boatlift
2 leveling mechanism includes:

3 a footpad;

4 a height adjustment mechanism for use in colinear alignment with an associated
5 boatlift leg and having a first end portion coupled to said footpad and having a second
6 end portion; and

7 a height adjustment actuator accessible along an associated one of said plurality of
8 boatlift legs and coupled to said second end portion at a predetermined angle with respect
9 to said alignment,

10 whereby the relationship of said footpad with respect to an associated one of said
11 plurality boatlift legs can be controlled.

1 19. (Original) A boatlift leveling mechanism as in Claim 18, wherein said height
2 adjustment mechanism includes:

3 a leg extension member having said first end portion and said second end portion ;

4 a height adjusting screw mechanism in cooperation with said leg extension
5 member, said height adjusting screw mechanism including an elongated screw having an
6 activating end and having a screw nut coupled to said leg extension member; and

7 an affixed bevel gear coupled to said activating end,
8 whereby said leg extension member is caused to move with respect to an
9 associated boatlift leg when said height adjusting screw mechanism is activated by
10 rotation of said affixed bevel gear.

1 20. (Original) A boatlift leveling mechanism as in Claim 19, wherein said height
2 adjustment mechanism further includes:

3 a height adjustment actuator having a mating bevel gear in cooperation with said
4 affixed bevel gear and having a height adjustment actuator for causing said mating bevel
5 gear to impart rotational movement to said affixed bevel gear,

6 whereby said screw is caused to rotate and move said screw nut long the length of
7 said screw.

1 21. (Amended) For use with a boatlift having at least one boatlift leg, a boatlift
2 leveling mechanism comprising:

3 a footpad;

4 a height adjustment mechanism for use in colinear alignment with an associated
5 boatlift leg and having a first end portion coupled to said footpad and having a second
6 end portion; and

7 a height adjustment actuator accessible along ~~an~~ said associated boatlift leg and
8 coupled to said second end portion at a predetermined angle with respect to said
9 alignment,

10 whereby the relationship of said footpad with respect to ~~an~~ said associated boatlift
11 leg can be controlled.

1 22. (Original) A boatlift leveling mechanism as in Claim 21, wherein said height
2 adjustment mechanism includes:

3 a leg extension member having said first end portion and said second end portion ;
4 a height adjusting screw mechanism in cooperation with said leg extension
5 member, said height adjusting screw mechanism including an elongated screw having an
6 activating end and having a screw nut coupled to said leg extension member; and

7 an affixed bevel gear coupled to said activating end,
8 whereby said leg extension member is caused to move with respect to an
9 associated boatlift leg when said screw mechanism is activated by rotation of said affixed
10 bevel gear.

1 23. (Original) A boatlift leveling mechanism as in Claim 22 wherein said leg
2 extension member further comprises:

3 an elongate structure having a predetermined length longer than the length of said
4 screw mechanism, said elongated structure capable of slidable engagement with at least a
5 portion of an associated boatlift leg, and said elongated structure having a predetermined
6 tubular cross-section, wherein said screw mechanism is positioned within at least a
7 portion of the tubular opening.

1 24. (Original) A boatlift leveling mechanism as in Claim 22, wherein said height
2 adjustment mechanism further includes:

3 a height adjustment actuator having a mating bevel gear in cooperation with said
4 affixed bevel gear and having a height adjustment actuator for causing said mating bevel
5 gear to impart rotational movement to said affixed bevel gear,

6 whereby said screw is caused to rotate and move said screw nut long the length of
7 said screw.

1 25. (Original) A boatlift leveling mechanism as in Claim 24, wherein said height
2 adjustment actuator further includes:

3 a shaped head that is accessible along a boatlift leg; and

4 a shaft having a first shaft end coupled to said shaped head and a second shaft end
5 coupled to said mating bevel gear,

6 whereby said leg extension member is caused to be moved in a first direction
7 when said mating bevel gear is rotated in a first direction and in a second direction when
8 said mating bevel gear is rotated in a second direction be selective activation of rotation
9 of said shaped head in a first rotation direction or in a second rotation direction,
10 respectively.

1 26. (Original) A boatlift leveling mechanism as in Claim 25, wherein said shaft is
2 oriented substantially perpendicular to said elongated screw.

1 27. (Original) A boatlift leveling mechanism as in Claim 25 and further
2 including:

3 a bracket having a first structure to hold said mating bevel gear in a rotatable
4 cooperative relation with said affixed bevel gear and having a second structure for
5 coupling said bracket to a boatlift leg.

1 28. (Original) For use in a boatlift having at least one boatlift leg, a boatlift
2 leveling mechanism comprising:

3 footpad means for supporting an associated boatlift leg on a surface;

4 height adjustment means for linearly altering the spacing of said footpad means
5 with respect to the end of an associated boatlift leg; and

6 height adjustment actuator means for selectively activating said height adjustment
7 means, said height adjustment actuator means positioned for accessibility along the
8 length of an associated boatlift leg.

1 29. (Original) A boatlift leveling mechanism as in Claim 28, wherein said height
2 actuator means includes:

3 driving means coupled to said height adjustment means for linearly increasing
4 said spacing when rotated in a first direction and for linearly decreasing said spacing
5 when rotated in a second direction;

6 shaft means coupled to said driving means for rotating said driving means; and

7 head means coupled to said shaft means for imparting rotation thereto, said head
8 means for receiving activating force to cause said driving means to be rotated in either
9 said first direction or in said second direction.

1 30. (Original) A boatlift leveling mechanism as in Claim 29 and further
2 including:

3 mounting means for coupling said height actuator means to said height adjustment
4 means.

1 31. (Original) A boatlift leveling mechanism as in Claim 30 wherein said
2 mounting means includes:

3 first structural means for positioning said shaft means at a predetermined angle in
4 the order of about 90 degrees with respect to said height adjustment means; and

5 second structural means for affixing said height actuator means to an associated
6 boatlift leg.

1 32. (Original) A powered boatlift comprising:

2 boat lifting means for supporting a boat;

3 cable means for leveling said boat lifting means and maintaining said both lifting
4 means level during raising;

5 a plurality of leg means for supporting said cable means;

6 winch cable means for raising and lowering said boat lifting means;

7 electric drive means for driving a drive shaft in a first direction in response to a
8 first input signal and for driving said drive shaft in a second direction in response to a
9 second input signal;

10 drive train means coupled to said electric drive means for converting high-speed
11 low-torque rotation input of said drive shaft to low-speed high-torque rotation output;

12 linear driving means coupled to said drive train means for controlling said winch
13 cable means to effect control of said raising and lowering of said boat lifting means; and

14 one or more boatlift leveling means, each coupled to an associated one of said
15 plurality of leg means, for leveling the boatlift.

1 33. (Original) A powered boatlift as in Claim 32, wherein said boatlift leveling
2 means includes

3 height adjusting means accessible along the length of an associated one of said
4 plurality of leg means for adjusting the height of said associated leg.

1 34. (Original) A powered boatlift as in Claim 32, wherein said electric drive
2 means includes

3 input means for coupling to a source of electrical power; and
4 switch means for applying said first signal and said signal.

1 35. (Original) A powered boatlift as in Claim 34, wherein said switch means
2 includes

3 manual switch means for applying said first signal and said second signal directly
4 to said electric drive means; and

5 remote switch means for remotely applying said first signal and said second signal
6 to said electric drive means without physical connection.

1 36. (Original) A powered boatlift as in Claim 33, and further including
2 load limiting means for sensing load current and disabling said electric drive
3 means when the sensed load current exceeds a predetermined level.

1 37. (Original) A powered boatlift as in Claim 33, and further including
2 delay means for delaying application of either said first signal or said second
3 signal that would cause a change of direction of movement of said boat lifting means, by
4 a predetermined time interval sufficient to allow said boat lifting means to come to a stop
5 before reversing direction.

1 38. (Original) For use with a power boatlift having a lifting structure including a
2 ball screw mechanism and a winch cable for raising and lowering a lifting structure, a
3 drive unit comprising:

4 electric drive means for providing power to the lifting structure for causing raising
5 and lowering of the lifting structure by controlling the direction of rotation of the ball
6 screw mechanism, said drive motor means including power input means for connecting to
7 a source of electrical power;

8 switch means for applying direction control signals to said electric drive means;
9 and

1 logic means responsively coupled to said control signals for controlling the
2 operation of said electric drive means to control the raising or lowering of the lifting
3 structure.

1 39. (Original) A drive unit as in Claim 38, wherein said switch means includes:
2 manual switch means for applying to said electric drive means a first direction
3 control signal indicative of raising and a second direction control signal indicative of
4 lowering; and

5 remote switch means for remotely applying said first direction control signal and
6 said second direction control signal without physical connection.

1 40. (Original) A drive unit as in Claim 38, wherein said logic means includes:
2 light switching means for selecting operation of one or more auxiliary lights; and
3 light actuating means responsively coupled to said light switching means for
4 applying power to said one or more auxiliary lights.

1 41. (Original) A drive unit as in Claim 40, wherein said light actuating means
2 includes:
3 timing means for removing power to said one or more auxiliary lights after a
4 predetermined time has elapsed.

1 42. (Original) A drive unit as in Claim 38, wherein said logic means includes:
2 conflict detection means for detecting concurrent conflicting ones of said
3 direction control signals and inhibiting application of said conflicting direction control
4 signals to said electric drive means.

1 43. (Original) A drive unit as in Claim 38, wherein said logic means includes:
2 overload means responsively coupled to said electric drive means for sensing an
3 overload condition when a load exceeds the capacity of the lifting structure and for
4 disabling said electric drive means when said overload condition is sensed.

1 44. (Original) A drive unit as in Claim 38, wherein said logic means includes:

2 delay means coupled to said electric drive means for delaying by a predetermined
3 time interval application of said direction control signals that signal change of direction
4 of the lifting structure to thereby allow the lifting structure to come to a halt before
5 reversing d

1 45. (Original) A drive unit as in Claim 38, and further including:

limiting means for limiting the movement of the lifting structure to a predetermined upper level of travel and to a predetermined lower level of travel.